

Are the lines perpendicular?

1.  $p_1: y = 3x + 5$

$p_2: y = \frac{1}{3}x + 5$

N

2.  $p_1: 7x + 2y = 5$

$p_2: 2x - 7y = 5$

$-\frac{7}{2}$   
 $+\frac{2}{7}$   
 $+\frac{2}{7}$

yes

~~no~~

Determine if the intersection of  $\overleftrightarrow{AB}$  and  $\overleftrightarrow{CD}$  forms a right angle.

3. A (-7,0) B (-2, -1) C (-3, 6) D (-4, -3)

AB  $\frac{0-(-1)}{-7-(-2)} = \frac{1}{-5}$  CD  $\frac{6-(-3)}{-3-(-4)} = \frac{9}{-1}$   
No

4. A (-4,4) B (4, 3) C (-2, -4) D (-1, 4)

AB  $\frac{4-3}{-4-4} = \frac{1}{-8}$  CD  $\frac{-4-4}{-2-(-1)} = \frac{-8}{-1} = 8$   
yes

Line j is perpendicular to the line with the given equation and line j passes through P. Write an equation of line j.

5.  $y = \frac{1}{6}x + 5$ , P (-3,1)

$1 = -6(-3) + b$

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$-17 = b$   $y = -6x - 17$

6.  $y = -\frac{5}{2}x + 1$ , P (-5,6)

$6 = \frac{2}{5}(-5) + b$   
 $-2 + b$

$8 = b$

$y = \frac{2}{5}x + 8$

Decide whether the lines with the given equations are parallel, perpendicular, or neither.

7.  $y = -5x - 2$

$y = 5x + 2$

N

8.  $y = \frac{1}{3}x - 1$

$y = -3x + 2$

$\perp$

9.  $2x - 5y = 8$

$5x - 2y = 2$

N

$m = \frac{2}{5}$   
 $m = \frac{5}{2}$

10. Find the equation of the line that is the perpendicular bisector of  $\overline{PQ}$ .

P (-4, 3) Q (4, -1)

M (0, 1)  $M = \frac{3-(-1)}{-4-4} = \frac{4}{-8} = -\frac{1}{2}$   
 $m = 2$

$m = 2$

$y = 2x + 1$

11. P (-2, 6) Q (4, 2)  $m = \frac{4-6}{-2-4} = \frac{-2}{-6} = \frac{1}{3}$

M (1, 4)  $m = \frac{3}{2}$

$4 = \frac{3}{2}(1) + b$

$2.5 = b$

$y = \frac{3}{2}x + \frac{5}{2}$

11. Find the unknown coordinate so that the line through the points has the given slope.

a. (-3, y) (-4, 4) slope = -2

b. (4, -3) (x, 1) slope = -4

$\frac{4-y}{-4-(-3)} = \frac{-2}{1}$

$\frac{4-y}{-1} = \frac{2}{-1}$

$y = 2$

$\frac{-3-1}{4-x} = \frac{-4}{1}$

$4-x = 1$

$3 = x$

Find the distance between the point and the line below.

12.  $(2, 3); 4x + 3y = 10$

$$3y = -4x + 10$$

$$y = -\frac{4}{3}x + \frac{10}{3}$$

$$3 = -\frac{4}{3}(2) + b$$

$$\frac{3}{2} = b$$

$$\begin{cases} y = -\frac{4}{3}x + \frac{10}{3} \\ y = -\frac{4}{3}x + \frac{10}{3} \end{cases}$$

$$(0.88, 2.16)$$

$$(2, 3)$$

$$d = \sqrt{(2 - 0.88)^2 + (3 - 2.16)^2}$$

$$d \approx 1.4$$

Find the distance between each pair of parallel lines.

15.  $y = -x$

$$y = -x - 4$$

$$\begin{cases} y = x \\ y = -x - 4 \end{cases}$$

$$x = -x - 4$$

$$2x = -4$$

$$x = -2$$

$$(-2, 2) (0, 0)$$

$$d = \sqrt{(0 + 2)^2 + (0 - 2)^2}$$

$$d = \sqrt{8}$$

$$d \approx 2.83$$

13.  $(-2, 1); x - y = 2$

$$+1 = -1(-2) + b$$

$$-1 = b$$

$$\begin{cases} y = -x - 1 \\ y = x - 2 \end{cases}$$

$$2y = -3$$

$$y = -\frac{3}{2}$$

$$x = \frac{1}{2}$$

$$(\frac{1}{2}, -\frac{3}{2}) (-2, 1)$$

$$d = \sqrt{(\frac{1}{2} - (-2))^2 + (-\frac{3}{2} - 1)^2}$$

$$d = \sqrt{12.5}$$

$$d \approx 3.54$$

14.  $(-2, 6); y = \frac{1}{4}x + 3$

$$6 = \frac{1}{4}(-2) + b$$

$$-2 = b$$

$$\begin{cases} y = -4x - 2 \\ y = \frac{1}{4}x + 3 \end{cases}$$

$$4(-4x - 2) = \frac{1}{4}x + 3$$

$$-16x - 8 = x + 12$$

$$-17x = 20$$

$$x = -\frac{20}{17}$$

$$y = -4(-\frac{20}{17}) - 2$$

$$(\frac{-20}{17}, \frac{46}{17}) (-2, 6)$$

$$17. y = -\frac{1}{3}x - 15$$

$$x + 3y = 15$$

$$y = -\frac{1}{3}x + 5$$

$$\begin{cases} y = 3x + 5 \\ y = -\frac{1}{3}x - 15 \end{cases}$$

$$y = -\frac{1}{3}x - 15$$

$$3x + 5 = -\frac{1}{3}x - 15$$

$$3\frac{1}{3}x = -20$$

$$\frac{10}{3}x = -20$$

$$x = -6$$

$$(-6, -13) (0, 5)$$

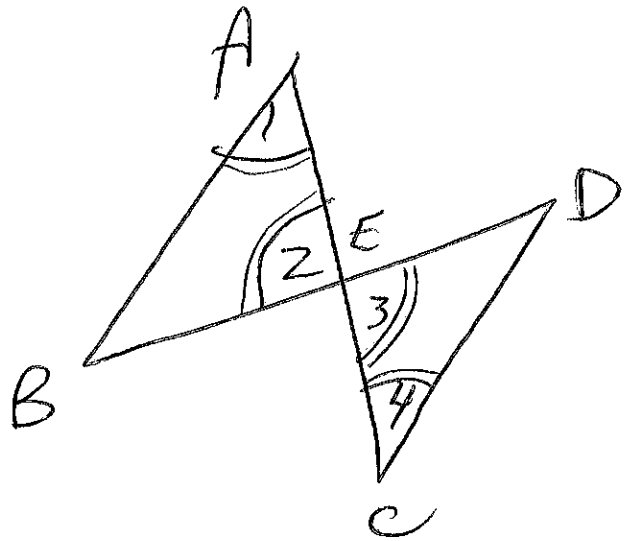
$$d = \sqrt{36 + 324}$$

$$d \approx 18.97$$

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34. G:  $\angle 1 \cong \angle 2$   
 $\angle 3 \cong \angle 4$

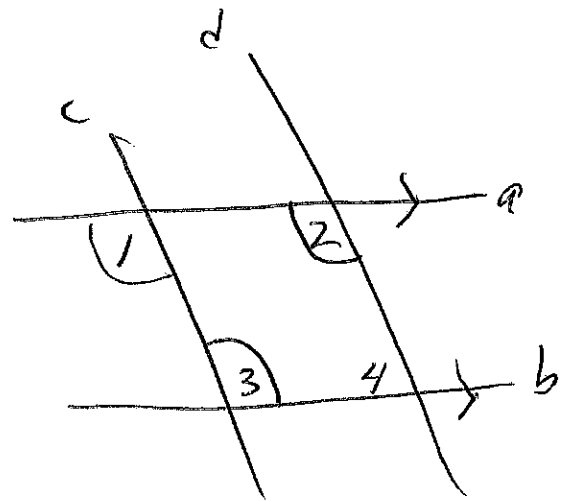
P:  $\overline{AB} \parallel \overline{CD}$



S.	R.
① ~	① Given
② $\angle 2 \cong \angle 3$	② Vert. $\angle$ s are $\cong$
③ $\angle 1 \cong \angle 4$	③ Subst
④ $\overline{AB} \parallel \overline{CD}$	④ Alt Int $\angle$ s Converse

35. G:  $a \parallel b$   $\angle 2 \cong \angle 3$

P:  $c \parallel d$



S.	R.
① ~	① Given
② $\angle 3 \cong \angle 1$	② Alt. Int $\angle$ s thm
③ $\angle 2 \cong \angle 1$	③ transitive
④ $c \parallel d$	④ Corr $\angle$ s Converse